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THE LOCATION OF INDUSTRIES.

In the nature of things there must be causes that explain why an industrial enterprise — mill, factory, foundery, dairy, refinery — is located at just this or that place, and not somewhere else. Some of these causes are non-rational, such as accident and caprice. Others are rational, but personal. The enterprise is started in order to boom the town, to give work to the unemployed, to utilize some plot or site otherwise unusable, to confer value on adjoining real estate or to give safe employment to capital under the watchful eye of the owner. The remaining causes are rational and economic; that is, the selected locality is deemed to offer certain advantages in production or marketing over any other equally available point.

If we seek what determines location, not of a single enterprise, but of a cluster of like enterprises or of an entire industry, the non-rational and personal causes are eliminated; and our inquiry lies almost wholly in the field of economic advantage. To review the economic forces that determine the location of migration of industries, and to describe their mode of operating, is the object of the present paper.

First in importance in fixing the home of certain industries is the presence of natural deposits or supplies. This determines imperiously the location of mines, quarries, oil or gas wells, fisheries, lumber and fur industries, and the collecting of nitrates, borax, sponges, pearls, buffalo horns. Thus the Chilian desert is the site of nitrate mines, the oyster industry haunts the Chesapeake, dye-woods are furnished from tropical forests, while the sulphur pits of Sicily supply brimstone to all parts of the world.

Besides the simple finding, digging up, breaking off, cutting down, dislodging, capturing, or bringing together of natural substances or growths, we often find these reduced, refined, prepared, preserved, or otherwise worked up before leaving their original locality. In this way there come to be connected with the purely extractive processes certain elaborative processes so closely joined that it is best to regard the two sets as constituting one industry. For example, salt is prepared in connection with salt springs or wells from which saline water is drawn. Here we may, in thought, distinguish two industries, one working on raw materials supplied by the other. Many elaborative processes are in this way attached to some extractive industry, and located with reference to it. The weaving of basket ware established itself in Franconia, owing to the splendid growth of willow-trees in the neighboring valley of the Main. Most of the slate pencils of the world are made in the Thuringian forest, the site of the finest of slate quarries. Petroleum refining has been closely connected with the Appalachian oil region and the wells of the Baku district. Most of the world's supply of potassic salts comes from the works that refine the output of the Magdeburg salt mines in Saxony. The bulk of natural commercial fertilizers will be prepared in Florida, South Carolina, and Algiers, because they possess the largest known fields of phosphate rock. The manufacture of cork is located largely in the towns adjoining the vast natural forests of Catalonia, while the asphalt of our streets is barrelled at the bitumen lakes of Trinidad.

For the other great group of extractive industries, agriculture, horticulture, viticulture,—the crop industries, in short,—soil, climate, and situation are all-important. "Straw-plaiting has its chief home in Bedfordshire, where straw has just the right proportion of silex to give strength without brittleness." * Kent and the valleys of the Pacific slope are famous for hops. Cuba and Hawaii are specialized for sugar-cane. Virginia is adapted to the ground nut, Kentucky to blue-grass and the horse. The southern shore of Lake Erie is suited to the grape. The freshness which Dutch and Danish meadows owe to their moist climate marks them out for cattle and dairying, no less than the high mountain meadows of the Sierras, snow-fed when the valleys are parched.

While all recognize grounds for agricultural specialization, few realize how strictly the economic limits of different crop areas are laid down by nature. A California foot-hill farm, owing to differences in soil, exposure, drainage, slope, and situation, is broken up into several very unlike areas, requiring different crops and cultivation. Often half a dozen different fruits may be successfully raised at once; while, if the orchards were transposed, their yield would be insignificant. During the development of agriculture the uses of the soil pass like Spencer's Cosmos from relative homogeneity to relative heterogeneity. At first a plot is given up to small grain, fruit, meadow, or garden, quite indiscriminately. Longer experience, however, detects the main conditions for each crop, so that more and more the possible uses of a tract, instead of appearing to lie in the same economic plane, arrange themselves serially in the estimate of the cultivator. Finally,

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* **Marshall**, *Principle of Economics*, p. 328 (2d edition).

exact science specifies each condition, and lays down the range of variation consistent with profitable culture. How precisely the area may be defined for each crop is suggested by the conditions of profitable sugar-beet raising, discovered at German experiment stations. The soil should be mixed of equal portions of limy, sandy, clayey, and humous earths, and should be dark. The ground should slope sharply southward. From the middle of April to the middle of June a daily average temperature of 51.26 F. is desirable; from the middle of June to the beginning of August, 65.84 F.; for the next two months 61.7 F. During the first period the beet ought to receive a total heat of about 1202 F., during the second 2102, and during the third 1832. The quantity of rain-fall for the three periods should be 97, 114, and 100 millimetres, respectively, or a total of 311. When agriculture can get on so exact a basis, the location of each crop will be very definite.

Climate is not only decisive for vegetal products, but appears to play no small rôle in locating manufactures. Partly to the fact that a very moist atmosphere is necessary in order to spin the finer cotton yarns is due the steady concentration of the cotton industry in Lancashire, where high hills inland keep off the dry east wind, and precipitate a copious downfall from the sea winds from the west. Schulze-Gävernitz has noted that even in this district the mills select the spots of greatest humidity, so that Oldham rather than Manchester has become the centre. Where the climate is dry, as in Switzerland, Alsace, or New England, the spinners must fill their rooms with warm vapor or else confine themselves to the coarser grades of thread. Lace-making is similarly favored by a damp climate.

For the manufacture of cigarettes, on the other hand, a dry climate seems necessary, in order to preserve the aroma of the tobacco. For some years this branch has shown a remarkable affinity for Egypt, although the raw materials, as well as the labor of the industry, are almost wholly brought in. Even within Egypt Cairo seems likely to become the centre of cigarette-making, because its climate is more suitable than is the humid air of Alexandria or Port Saïd.

The metallic, ceramic, and glass-blowing industries are apt to shun hot climates, regardless of their compensating advantages; while the packing business settles in latitudes where the ice crop is sure to be cheap and plentiful.

Probably next in importance is nearness to the sources of raw or auxiliary materials. This consideration will have most influence, first, when the materials are bulky and heavy relatively to their value; second, when the finished product embodies but a small part of the materials employed or contains a much greater value; third, when transportation facilities are backward, or the materials are produced in a mountainous district or in the interior of a country where the cost of transportation is unusual. These conditions are met with in the metal industries, so that ore is for the most part smelted near the mine, if fuel be forthcoming. For the same reason the European match industry gravitates toward Eastern Germany and Russia in quest of match wood. The furniture manufacture and the making of agricultural implements centre more and more in Indiana, Ohio, and Michigan, striving to get as near as possible to the saw-mills supplying hard lumber. The saw-mills, in turn, invade the wilderness or follow up logging streams in quest of their material. While there is no great shrinkage in sawing logs into lumber, the greater ease of handling is sufficient to carry the saw-mill to the logs instead of the logs to the saw-mill.

The southward drift of the cotton industry is partly owing to the saving in freight of raw cotton, while the symptoms of decay in Lancashire cotton centres may likewise be due to remoteness from raw material. The preference of the milling industry for the wheat districts and of distilleries for the corn country is marked. The meat-packing business, with the advent of range cattle, sought to leave Chicago for Missouri River points, in order to shorten the carriage of hide, hoofs, and offal. Paper factories follow the small grains, and it is not difficult to connect the manufacture of citric acid in Sicily and Calabria with their citrus crops. Sugar-refining has broken away from the plantation, but the crushing of the sugar-cane and the boiling of the juice to molasses or coarse sugar will continue near the cane-field.

Here we bring in a new consideration,— the fact that extractive and elaborative industries are linked together by technical as well as economic bonds. The perishability of the materials makes the location of the dependent industry in many cases something more than a matter of freight bills. Neither cane nor raw juice can be carried far without spoiling. For a similar reason salmon canneries will cling to the banks of the Columbia, while fruit and vegetable canneries will stick close to Maryland orchards and California ranches. So, despite dear labor, cheese factories and creameries will frequent the cross-roads in Iowa. In France the oil press will not be set up far from the olive and the almond. The beet-sugar factories must locate with reference to the beet district. The wine-press cannot be far from the vineyard, nor the cider-press from the orchard. This tether that binds one industry to a certain spot, despite the economic attractions of other localities, is weakened by every new device to preserve form and stay decay. So far the frozen meat cargoes and refrigerator fruit shipments are in the service of the consumer rather than of dependent industries; but we may yet see these industries set free to obey other forces of location.

Sometimes nearness to auxiliary material is the prime consideration. "Staffordshire makes many kinds of pottery, all the materials of which are imported from a long distance; but she has cheap coal and excellent clay for making the heavy 'seggars' or boxes in which the pottery is placed while being fired." "The Sheffield cutlery trade is due chiefly to the excellent grit of which its grindstones are made."* Chicory is grown much in West Flanders because of a sandy soil and "an abundance of water for properly washing the root."† The inferiority of the product of the Walloon provinces consists in its being imperfectly washed, owing to the lack of water. Tanneries are apt to settle near woods supplying tan-bark, while the importance of limestone in smelting iron ores is often decisive.

Whenever great heat is needed, it is impossible to ignore the sources of fuel supply. This, therefore, is of great importance in locating the metallurgical, chemical, and refining industries, the smelting, casting, rolling or forging of iron or steel, the manufacture of brick, hardware, glass, stone-ware, pottery, and porcelain. "The iron industries in England first sought the districts in which charcoal was plentiful, and afterwards they went to the neighborhood of collieries."‡ The mirror-glass industry settled in Bohemia two centuries ago on account of the supply of fuel guaranteed by the surrounding forests. The past concentration of the iron and steel industry in Pennsylvania, as well as the recent striking development of this branch in Northern Alabama, shows proximity to coal as a controlling factor.

When coal is burned simply to develop steam power, its cost of carriage is not so great as to make nearness to source of fuel a prime desideratum in location. Its rival, water power, on the other hand, has not been portable in

*Marshall, *Principles*, p. 328.

† *United States Consular Reports*, No. 169, p. 157.

‡ Marshall, *Principles*, p. 328.

any form, and, if used at all, has to be used in strict connection with the falling water that generates it. Around eligible water power, therefore, settle industries employing heavy machinery, such as flour-mills, saw-mills, planing-mills, and many manufactures of wood and metal. The manufactures that seek cheap power are mainly those that receive the crude natural materials direct from the extractive branches, and impose on them their first and greatest change of form. For the more purely elaborative processes, lying nearer the consumer, labor and light machinery effect the transformations.

A power site thus becomes the core of an industrial centre. Lowell, Lawrence, Fall River, Concord, and other manufacturing towns on the streams tumbling from the granite hills of New England owe their rise to this cause. The South owes part of its growth to the fall in its rivers. Great milling centres, like Rochester, Niagara, and Minneapolis, are the result of cheap power. It is likely that, with the advent of the economical transmission of electrical energy to a distance from the place of generation, the value of the more eligible power sites will be enormously increased; while, on the other hand, the concentrating tendency being checked, the milling industries will be left free to follow other attractions. While they will more and more seek districts enjoying abundant natural power, yet within the area of transmission their location will be determined by other considerations. Whether power can ever be supplied from a central source over a large area, as water is now supplied to residents of a city,— to all alike on the same terms,— is an interesting problem, and still more interesting is the effect on the location of industries.

Sometimes a trade takes up its home where, as supplement to some other branch, it can fill up an industrial chink. The great basket-ware industry of Upper Franconia resists dislodgment by factory product, because the weaving is done by peasants in the intervals of rest from their farm labors. So, too, in Switzerland hand-carving maintains itself, because not only can it be pursued in the winter and in the long evenings, but the occupation is so light as to refresh rather than to weary. The breeding of canary birds, also, is a secondary industry that frequents the cottages of the very poor. As its former adepts, the wood-cutters and miners of the Harz, have prospered by the access of summer visitors, the industry has shifted to the homes of Hanoverian weavers and the cabins of the poorer peasants of North Germany. The making of hand-made lace is usually found wherever the convent system prevails. "Where metallic and engineering works naturally congregate, industry offering some work of lighter character, whether hand work or machine tending, suitable to busy women and children, will be apt to appear." * "As textile work passes more and more into the hands of women, this tendency to make it a parasitic trade, thriving upon the low wages for which women's labor can be got where strong and well-paid male work is established, will probably be more strongly operative." † This is true also of ship-building towns and mining and agricultural centres near textile districts. In all these cases the industry strikes root wherever there is unused labor power in some members of the family.

But there are cases in which it maintains itself by utilizing waste materials or capital. The poultry industry is in most countries scattered and conducted in a small way, because it fills a chink in farming, and up to a certain point costs almost nothing. A good deal of stock-raising is merely incidental to farming. The peach industry of Belgium is likewise a parasite. After many efforts at profitable culture the Belgians tried the sunny sides of their houses, "and met with such astonishing success that

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* Marshall, *Principles*, p. 331 (1st edition).

† Hobson, *The Evolution of Capitalism*, p. 113.

there are few houses to-day in Belgium upon whose southern exposure trees are not trained." * The clusters of side industries that grow up about packing establishments, refineries, or gas-works, engaged in turning refuse into by-products, are also parasitic. We note, on a higher plane, the obvious connection between the literary and scientific life of an educational centre like Leipsic and its prominence as a book mart.

But an industry may be acted upon repellently rather than attractively. The manufacture of aluminum by the electric process generates gases which kill all vegetation in the neighborhood. If these gases cannot be absorbed, this mode of manufacture will be driven off to unfertile districts, where the damage will be at a minimum.

The residence of the consumer frequently determines the location of an industry. The whole group of service industries of course follow the consumer. In fact, the chief economic difference between goods and services lies in the fact that the place of production of the latter is in relation to the consumer. Besides this, certain industries that undoubtedly produce goods, such as tailoring, millinery, photography, and pharmacy, must refer to the person of the consumer. Repair work settles near him. Confectioneries, bakeries, and market gardens must be near to him to avoid deterioration of product. Daily newspapers are published where the readers dwell, in order to secure promptitude. The bulk and waste of artificial ice in transportation, as well as the bulk of coopers' products, compel them to be made where wanted.

If raw materials, fuel, and power are necessary to production, no less are labor and specialized capital. The capital required for buildings and machinery is, however, rarely influential in locating an industry, because the buildings are locally supplied, while machinery, if brought from elsewhere, is transported once for all, and cannot

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* *United States Consular Reports*, No. 167, p. 638.

therefore compete with material or fuel as a factor in location. Capital, the most mobile and dynamic factor of production, seeks its allies instead of requiring them to come to it. It effaces itself in the location of industries, consulting always the local affinities of the other productive factors.

Labor is not sharply localized, as is natural power, for instance. Like fuel or materials, it can be transported; and, like them, its prices in different markets perpetually tend to converge. But the transplantation of the laborer entails the expense of transportation of himself, family, and belongings, and all the costs in trouble, risk, and sentiment that attend a change of residence. And though these costs are incurred but once, while the moving of material or fuel is recurrent, it oftentimes happens that the subsistence of the laborer must follow him. Owing to these obstacles to movement, the efficiency-price of labor does not approximate a level, but exhibits local differences that are of no small influence in establishing industries.

A relatively low efficiency-wage (which is quite different from a low time-wage) constitutes a demand for industries which will not long remain unsatisfied. From time to time, as back districts are tapped by the railroad, commercially isolated countries are opened up, or belated races are exposed to the influence of modern progress, occur migrations of manufactures, eager to exploit cheap labor before it learns its value in wider markets. The negro is the magnet that is attracting mining and metal industries to the new South. Our commercial agent at Luxemburg writes, "Cheap wages for women are an indispensable prerequisite of a prosperous glove business, without which there can be no continued success. In this respect Luxemburg was found to be very suitable, as . . . . the women and girls are satisfied with the very lowest wages."* The gravitation of silver-mining towards Mex-

* *United States Consular Reports*, No. 161, p. 307.

ico, the rise of cotton-spinning in India and Japan and of ship-building in Japan and China, the affinity of the clothing industries for our seaboard cities, supersaturated with stagnant immigrants,— all exemplify the disposition of capital to seek out cheap labor, if cheap labor will not come to it.

While the elaborative industries performing the first operations on nature's products are the most regardful of nearness to materials, fuel, and power, the higher branches that fabricate finished goods are apt to attend more carefully to labor cost. In the manufacture of clothing, linen, underwear, gloves, boots and shoes, millinery, cigars, patent medicines and cutlery, the cost of labor enjoys the controlling position. High cost of living requires high wages, and therefore repels these industries, while on the other hand, they are attracted to places where living is cheap. Living will be cheap in small places, supplied from the surrounding country, or in large cities that, on account of superior transportation facilities, are able to draw their supplies from a wide area. Apart, therefore, from the cost of moving materials or product, industries will tend to congregate in commercial centres, in order to profit by the cheapness of labor that results from a cost of living kept low by easy resort to a wide supplying area.

Many items enter into the articles of union between labor and capital besides the matter of remuneration. Cash wages, prompt payment, notice of discharge, liability of employer, provision of fire-escapes, fencing of machinery, limited hours for women and children,— all these obligations, whether imposed by law or by labor organizations, will, if unattended by heightened efficiency, be unfavorable to capital, and may lead to its migration. So, too, industrial disturbances, rioting, frequent and prolonged strikes, dispose capital to exodus, if a more tranquil seat can be found. With more capitalistic methods of production, outlay for labor and material diminishes relatively to that for plant and machinery. This necessity for specializing and sinking vast initial sums makes industry increasingly dependent on order, security, and continuity of conditions. Civil disorder, revolutionary changes, sudden alterations in laws, or even a vigorous reform policy, scare away capitalistic industries. On the other hand, docility of laborers, absence of trades-unions or restrictive laws, unquestioning submission to the terms offered by capital, attract an industry. This mobility of capital has sometimes been cited as if it negatived all voice of labor in fixing the conditions of work. The consideration, however, has a practical rather than a moral validity. Capital will associate itself with labor on the most advantageous terms it can get, and no possible concession to it can prevent its exodus if it can do still better elsewhere. The fact that all upward movement of labor involves just such "shocks" and "checks" to capital has not prevented improvement in conditions.

If obligations repel, privileges will attract a capitalistic industry. Only slavery could have maintained for Jamaica her place in sugar manufacture. The system of contract permitted to sugar-planters in Guiana and Hawaii, on the other hand, leads to a rapid expansion of planting. Easy incorporation, light taxes, severe penalties for offences against property, lavish grants of authority to private watchmen, such as the Coal and Iron Police of Pennsylvania, prompt use of police or military in labor disputes, pliant legislatures, complaisant courts, corrupt officials,— all these, so long as they provoke no dangerous reaction, attract outside capital, and make a community the home of vast industrial investments. When favor extends to exemption of certain industries from taxation, exclusion of competing foreign goods, free importation of machinery or raw materials, bounties, subsidies, or grants, all the afore-mentioned forces of location may be overcome, or rather limited in scope of operation to the protecting community. There is, in fact, no economic advantage of one place over another which may not be overborne by an artificial advantage. Where aid is given not temporarily in order to root an industry in a naturally favorable location, but permanently in order to keep it where it is unsuited, the industry becomes a parasite, sapping profits out of the unfavored industries. If the transfusion of profits is so excessive as to overcome the local advantages enjoyed by these industries, they will migrate to countries of lighter taxation. Public aid, therefore, may dislocate one industry while locating another.

Occasionally we find industries confined to a certain locality because of dearth elsewhere of adequate technical knowledge and inventive talent. The manufacturers of one country get a start, and by recourse to native technique are able to keep their lead. In the manufacture of dental instruments and supplies Americans have unquestioned leadership, owing to their inventive faculty and to the constant stimulus afforded by a highly developed profession. Similar causes give them pre-eminence in the making of farm machinery, while the ingenuity with which utility and convenience are wrought into their implements and tools gives American hardware a great name abroad. The lead acquired by France in articles of beauty and taste is undoubtedly due to the presence of abundant and well-organized artistic ability. The high development of the chemical industries in Germany is connected with the ardent cultivation of chemical science in that country. While of course experts may be transported as any other factor in production, experience shows that an industry permanently dependent upon imported technical knowledge will pay high salaries and receive service less conscientious, responsible, and well-considered than would be rendered by the same men at home. Differences in expertness, therefore, at present count for very much in international competition, and must be duly reckoned with.

It is to be recognized, however, that, by manual training, trade, and technical schools, agricultural colleges, museums and exhibitions, the industrial capacity of a people is almost indefinitely modifiable. Witness the success with which England has in the last fifteen years educated her people. Whereas formerly her textiles were mainly common goods, they are now to a considerable extent high-class fabrics, finding ready market anywhere. This flexibleness of industrial ability abolishes, in the long run, most specializations not based on natural differences in localities. It is a general law that interchange of products between two peoples precedes interchange of population, of scientific knowledge, systems of education, technical methods, and industrial standards; the reason being that the former requires relatively slight modifications of an economic system from without, while the latter implies deep-seated inward changes, remaking national character. During the interval of superficial contact, expanding commerce alters the production of the two peoples, each with reference to the other, and leads to an extreme economic interdependence, the more backward people producing raw material and food, while the other engages in manufacture. Closer commercial relations, however, permit in course of time a communication of technique and methods and a transplanting of experts and entrepreneurs, tending to level up the industry of the one people to that of the other. This in turn favors the restoration of elaborative industry to its natural home, reduces the exchange of goods, and lessens the amount of economic interdependence. Precisely this effect is now visible in the intercourse of Oriental peoples with Western Europe.

With the growth, in time, of a more uniform industrial civilization, the jealous encouragement of home manufactures, now so striking and universal in all but the most advanced countries, may be expected to become less needed, and therefore rarer. It is likely, therefore, that the mental, moral, and political differences between peoples will become less influential as factors of location. The anomaly of producers of materials sending their products to the other side of the globe, there to be worked up and returned to them, will become less common as manufacturing industries locate near the source of power, fuel, or materials on the one hand, near the consumers on the other hand, or else at some point on the path between the two. Owing to deep-seated race differences or to unlikeness due to the prolonged selective sifting of social and industrial systems, there are lasting diversities of endowment that will affect the location of the superior manufactures, demanding high technical and artistic skill in the operative. But the art of fabricating machine-made goods, which now form the bulk of manufactured articles, is likely to become the common property of the world. While, therefore, the specialization of areas will increase indefinitely, the specialization of races and peoples, now so striking, is a transitive phenomenon, doomed to relative decline.

Having reviewed the factors of location, we will next consider their mode of operating.

We must, at the outset, distinguish between the process of concentration and that of migration. The former is due to the advantages of one form of industry over another, the latter to the advantages of one locality over another. The economic forces making for concentration are not at all the forces of location we have been studying. A dispersed industry concentrates in one place — *i.e.*, localizes — because of the economies that result from the dwelling of many enterprises of one kind in the same neighborhood. A large number of work-people living in a single community can improve faster in skill than if scattered in small separate groups. Methods are rapidly levelled up to the best known, so that it is easier for a new process or type of skill to become a standard. The prompter appreciation and adoption of an improvement stimulate latent inventive talent. Numbers make it possible to maintain special trade schools, museums, and laboratories, for promoting efficiency. Moreover, when the aggregate output is large, certain specializations appear between the establishments, and the most expensive machinery can be used. Shops for the building and repair of machines settle close at hand, and subsidiary industries spring up. In connection with the centre there grows up an organization for exchange, able to develop a market for raw material and for product that may economize the use of middlemen. All these forces of localization are manifestly distinct from the forces of location. For the reasons why an industry should be centred in one place and not scattered in several do not explain why it should settle in this place, and not in that.

We will now consider three cases,—when the forces of concentration aid those of location, when they are neutral, and when they are opposed. The concentration of a scattered industry usually comes about by some locality outstripping the other centres and finally extinguishing them. The initial growth is due, of course, to some superiority of this locality over the others. But, as the centre leaves its rivals behind, it requires a momentum from the fact that the economies of concentrated industry now work in its favor as well as its special advantages. With these urging it in the same direction, one might wonder why the rising centre does not go on killing out its small rivals over larger and larger areas and appropriating their business. But trees do not grow up into the sky, nor does an industrial centre expand till it absorbs the custom of the globe.

For this there are two chief reasons. One is that, as a place becomes more of a centre, its special advantage tends to disappear. If it is water power, the multiplication of mills raises the cost of power till it is no longer cheaper than elsewhere. If it is accessible coal, the increase of consumption compels shafts to be sunk deeper and galleries to be cut farther till the local superiority has vanished. The other reason is that, as industry concentrates, the radius of the territory from which its materials and the subsistence of its dependent population are drawn, and of the territory over which the finished product is distributed, increases; the average cost of transportation per unit of industry grows, until its growth neutralizes the economies of further concentration.

If a centre has exhausted its special advantage, it will grow only when the industry as a whole grows. But, if its further expansion is checked solely by cost of transportation, every reduction of freight charges will enable it to widen its sphere of influence and gain on its scattered rivals. Moreover, as size is in proportion to tributary area, its growth will be as the square of the increase in the portability of goods. Such is the location process of the scattered industry.

If now we imagine two such centres at a distance from each other to expand their influence till they kill out the small concerns in the buffer territory between them and come into competition with each other, the problem becomes one of mere relocation rather than of localization and location. Economic concentration being already attained, the issue of the struggle will turn solely on the relative attractiveness of the rival localities. Supposing transportation to cheapen indefinitely, the industry will desert the inferior spot, provided the other locality does not exhaust its superiority in the course of its growth. We must note, however, that transport improvement itself sometimes reverses the position of the rivals it brings into competition, as when one locality is thereby enabled to reach an inexhaustible source of materials, while the other, as it grows, must sacrifice the gain by lower freights in longer hauls.

Sometimes the forces of location select an entirely new spot. Through movements of population, discovery of unsuspected advantages such as mineral resources, opening of backward countries, or building of railroads, a place formerly unknown or ignored is seen to possess superior suitability. This fact, however, is far from insuring the immediate migration of the industry to the more favorable locality, because the advantages of concentration now oppose local advantages. The incipient enterprises in the aspiring locality must contend with long-established rivals who have the economies of association all on their side. Moreover, whatever the original advantages of the older seat, these have been re-enforced through the long residence of the industry. Further adaptation has gone on, related branches have grown up in the neighborhood, a transportation and supply system has been formed, dependent, it may be, on this industry alone, permanent improvements have been made, to say nothing of relatively durable investments of capital. Besides this, the chief occupation has struck root in the population itself. Their residence, mode of life, habits, traditional skill, organizations, systems of education, and even their public institutions and enterprises have become adapted to it. All these reactions create for an industry a matrix that clasps and holds it with much firmness.

The power of a locality to hold an industry, therefore, greatly exceeds its original power to attract. The new locality must not only excel the old, but must excel it by margin enough to more than offset the resisting power of the matrix. It must offer excess of natural fitness to balance the artificial fitness of the old centre. Time is, however, an all-important factor. Even a moderate pressure, if long continued, will detach an industry from its matrix. Though the subsidiary and affiliated branches may unite with the main industry in sustaining the struggle, they will, after a while, lose hope, and withdraw. The laboring population may accept low wages in order to keep their homes and their common property, but the younger, unspecialized generation will drift away to better opportunities. Little by little all artificial support crumbles away, till, in the long run, a place must hold an industry, if at all, by its natural suitability, re-enforced by whatever lasting improvements have been made.

The fact that the resisting power of an established industry is so great, together with the fact that private means cannot supply to a young enterprise the resources for the prolonged struggle required to detach from a long-seated industry the ganglion of interests that protects it, suggests, and is, in fact, a foundation for the policy of temporary assistance from the community. The principle of government protection or local credits or subsidies to infant industries is therefore thoroughly sound. As the capacities of a developing region are brought to light, judicious temporary aid to well-adapted enterprises may be regarded as hastening those local specializations without which maximum productiveness can never be attained.

The departure of the chief industry may bring upon a specialized centre slow and dismal decay, tending towards final extinction, or it may bring swift destruction. When the handicap is not heavy, the trade languishes by gradual withdrawal of sustenance. Those savings out of profits which would have been devoted to extension are invested elsewhere. That portion which should be set aside to repair the deterioration and using up of fixed capital is likewise drawn off. Plant, buildings, and machinery receive only such outlay as is necessary to wear them out with tolerable completeness. Thus the industry is carried on, on a narrowing basis, till, the sunk capital being used up, it abandons its former home altogether. But, if the new locality has great advantages over the old, desertion will be precipitate. The low price of product, set by the sharp competition of the rising centre, may not only fail to yield to the old centre any adequate return on fixed capital, but it may not even avail to pay for material and labor. In this case production must cease at once. Factories must be dismantled, machinery transplanted or sold as junk, and buildings degraded to inferior uses or suffered to fall in ruin. "It is distressing," says an English inspector, "to witness the havoc which has been made in some picturesque valleys in Lancashire by the pressure of modern emulation and competition. Factories and cottages closed and untenanted, many of them unroofed and in ruins, meet the visitor at almost every turn, and give some indication of the great sacrifice of capital which must have been made before the present hopeless condition was reached." A tornado can hardly vie with the forces of competition in power to level and destroy.

If capital is the active element, seeking out labor and pairing with it, it is also the first to abandon the union. Labor, the more inert element, often endures long agony and death-in-life ere it can be brought to abandon its home, and seek work where it can be found. When technique is advancing and discovery is rife, shiftings of industry, attended with upbuilding of one place and decay of another, are frequent. For the most part, they signify economic progress, or, at least, so much of that progress as consists in relocating industry. Yet, as they inflict on the labor of certain districts unmerited adversity, in the form of low wages, unemployment, and declining standard of living, they give rise to undue pessimism as to the condition of labor, if the phenomena of migration are not fully understood. A precisely opposite error arises by too exclusive an attention to vigorous young centres of growing production, where the feverish exploitation of special local advantages creates unusual prosperity.

That the successive migrations of industry to points of greater and greater advantage can ever lead to a final settlement is not for a moment to be imagined. Besides exploration, discovery of unlooked-for resources, increase in accessibility, there are other dynamic factors to disturb the repose of industry, and compel movement. The exhaustion of local natural deposits or growths, such as coal field, forest, or seal herd; the continual progress of science and the arts, involving the displacement of this or that material of production or form of motor power by a superior substitute; the changes in human wants, due to new ways of thinking, feeling, and living, by which is altered the relative importance of the elements in consumption; the changes in the distribution and massing of population, springing from recognition of social, political, or residential differences between localities,— all these will inevitably alter the comparative advantages of places, and lead to relocation of industries.

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